Cooperative Water Program – Priority Activities for FY13

Development of Priorities

Priority activities for the Cooperative Water Program (CWP) support national interests and the two-part mission of the Water Mission Area (WMA), which are to minimize loss of property and life from water hazards, and sustain water availability—quantity and quality—to meet competing demands in the face of population growth, land development, and climate variability

Surveys conducted in FY12 indicate that these priorities also reflect "on-the-ground" needs of CWP Cooperators (currently more than 1,550) and the most common water issues addressed across the Nation within 48 USGS Water Science Centers. This alignment is important as the CWP is a cost-share Program with jointly funded and planned activities that address many of the Nation's most pressing water-resource issues—including flood and drought mitigation, water availability, safe drinking water, sustainable ecosystems, impacts of energy development, and climatic and land-use changes—while providing science relevant to local, State, and Tribal water management decisions.

Such alignment also places CWP data and activities as inherently foundational for other USGS Programs, such as providing data and analyses on water use, ecological flows, and evapotranspiration for a national Water Census. Priorities for FY13 (listed below) are even more directly specified (than in past years) in order to proactively support and demonstrate the alignment of CWP with USGS national initiatives and programs. Specifically, "on-the-ground" CWP activities that can be leveraged and regionalized/nationalized (synthesized), and thereby benefit multiple programs while serving CWP objectives, are prioritized.

To achieve this goal, these priorities have been developed in concert with Program Coordinators of other USGS Programs.

Of utmost priority, inherent in all CWP activities, is the CWP continued commitment to broad scientific and interdisciplinary expertise; long-standing, high-quality, nationally consistent procedures and quality assurance; management and delivery of reliable, accessible, and high-quality water information; and the development of innovative assessment and data-collection tools to cost-effectively address water issues across the Nation.

Cooperative Water Program Background

The CWP values data collection activities *and* scientific investigations. The Program strives to maintain a balance in support of national USGS hydrologic networks and scientific investigations that inform local, State, Tribal, regional and national water issues.

Overall, CWP annually supports nearly 700 hydrologic investigations of the quality and quantity of the Nation's water resources, resulting in more than 300 publications. Key topics relate to water quantity and quality of surface water and groundwater to meet the Nation's myriad of water uses; environmental flows in streams needed to maintain ecosystem health; effects of changing land use on water availability; flood inundation and analysis of risks; sediment; and emerging contaminants in drinking water.

Data-collection activities support USGS national hydrologic-data networks, which constitute the foundation for all USGS mission areas, as well as watershed and aquifer management decisions by stakeholders across the Nation. The comprehensive, uniform, and accurate data on surface-water, groundwater, water-quality, sediment, and water-use are required for sustaining water that is available and safe for all drinking, ecosystems, industry, agriculture, energy, and navigation, and for water-rights determination by State and Federal agencies, as well as for simulating and forecasting hydrologic conditions and events. In addition, the long-term record of water quantity and quality developed by USGS is invaluable as a baseline for detection of change and to assess human influence over time.

The CWP partially or fully supports 77 percent of the USGS stream gages throughout the Nation, 95 percent of which provide information in real-time. In addition, the CWP supports more than 8,000 groundwater observation wells, many of which provide real-time information that is critical for drought analysis and tracking, as well as about 4,000 water-quality monitoring sites (many of which are real-time).

Priorities – Data Collection

- Continued operation and maintenance of NSIP and (or) long-term (greater than 10 year record) streamgaging stations;
- Enhancement of the hydrologic-data networks for improved hazards forecasting and protection, and assessment of water sustainability for human and ecological needs;
- Improved accessibility and delivery of data; and
- Increased availability of real-time data for surface water and groundwater.

Because of the widespread importance of USGS data, Science Centers are strongly encouraged to continue to allocate CWP funding to support data collection and USGS hydrologic data networks at similar levels in FY13. The National Program will continue to track and strive for a balance between data collection and interpretative studies (assessments and research), which is currently, on average, about 60 percent data collection and 40 percent interpretative studies within Centers.

Priorities—Assessment and Research

(1) Assessments of floods and droughts (Hazards; NSIP; Groundwater Resources Program)

- Development of dynamic mapping and assessments to track and forecast water hazards.
- Assessments and forecasting of low and high hydrologic conditions in streams and groundwater, at monitored and unmonitored sites, to assist those who are responsible for building infrastructure, managing water supplies, and sustaining ecological health.

(2) Assessments and tracking of water use/consumptive use/water availability (Water Census; Groundwater Resources Program; Ecosystems)

(a) Water Use

- Development of site-specific information (such as withdrawals) (as opposed to aggregate summaries by county).
- Development of consumptive use coefficients and (or) methodology. (Example could be methodologies used to estimate consumptive use through public-supply systems that could be generalized to other areas.)
- Placement of water use input files into SWUDs from data used in groundwater modeling activities (i.e. "taking the next step" to generate site files so that the information used in modeling has long-term and wider applications).

(b) Groundwater/Surface Water Relations

- Development of regional base flow and recharge estimates that could contribute to a standardized set across a region or the Nation.
- Assessments of groundwater and surface water relations and water budgets from hydrologic models.

(c) Ecological Flows

- Development and maintenance of aquatic biological databases that could contribute to a "one-stop" portal that serves biological information.
- Studies relating aquatic biology (communities, taxa) to ecological flows.

(d) Evapotranspiration (ET)

- Development and application of "on-the-ground" techniques for measuring ET (either landscape ET or crop-related ET) to support calibration and verification of ET estimates from remote sensing.

(e) Man-made impoundments

- Methods and studies that look at water availability associated with impoundments (such as impacted by releases, large storms, droughts, etc)over relatively short time steps (monthly).

(3) Assessments of water quality in streams and groundwater (NAWQA; Toxics; Ecosystems)

(a) Monitoring (Note: Priority should be on those stations/projects that track conditions, sources, transport, and (or) effects over the long term (such as, for example, the 27 CWP-supported tributary sites monitored in the Chesapeake Bay watershed and used for watershed modeling)

- Contributions to national stream and river monitoring networks, including "benchmark" sites (or reference sites), agricultural/urban watersheds, large inland rivers, and coastal sites.
- Enhancement of real-time continuous water-quality monitoring at stream and river sites.
- Monitoring of contaminants in deep groundwater used for drinking water sources.

(b) Water-quality assessments/modeling

- Applications/refinement of SPARROW and associated decision support tools used for extrapolation and forecasting of nutrients.
- Watershed studies that help to assess how water moves and transports contaminants, nutrients, and sediment over the land -- that can be integrated in multi-scale efforts that track through basins, ultimately to receiving waters, like Gulf of Mexico.
- Short-term trend assessments and forecasts of water-quality changes resulting from changes in management practices and land use.
- Long-term trend assessments and forecasts of water quality resulting from climate and land use change.
- Real-time modeling applications and estimates for streams and reservoirs.
- Modeling applications forecasting groundwater flow and contamination in aquifers used for drinking.

(c) Ecological assessments/modeling

- Application of O/E models.
- Environmental flow assessments.
- Effects of streamflow alteration, contaminants, nutrients, and sediment on aquatic health.

(4) Assessments of possible impacts from energy development, such as hydraulic fracturing on water quantity and quality (Energy and Minerals)

(a) Baseline water quality and quantity measurements and assessments as natural gas exploration and production accelerate among different geologic and environmental settings across the US

- Measurements of base flow; reservoir storage; and groundwater levels (retrospective assessments of groundwater occurrence).
- Assessments of ambient groundwater and surface water quality (including in sources used for drinking, private and public wells, and surface water intakes).
- Characterization of site geology, hydrogeology, groundwater flow, and hydro-stratigraphy (such as through geophysical data).
- Assessments of spatial and temporal gaps in areas of unconventional oil and gas production.

(b) Tracking and assessment of hydrologic processes and changes over time

- Monitoring and detection of hydraulic fracturing-derived contaminants in water and sediment.
- Assessment of possible impacts on channel morphology, stream chemistry and benthic invertebrate and fish assemblages.
- Computer watershed modeling of hydrologic processes.

(c) Database development and web access to water quantity, quality, and biology